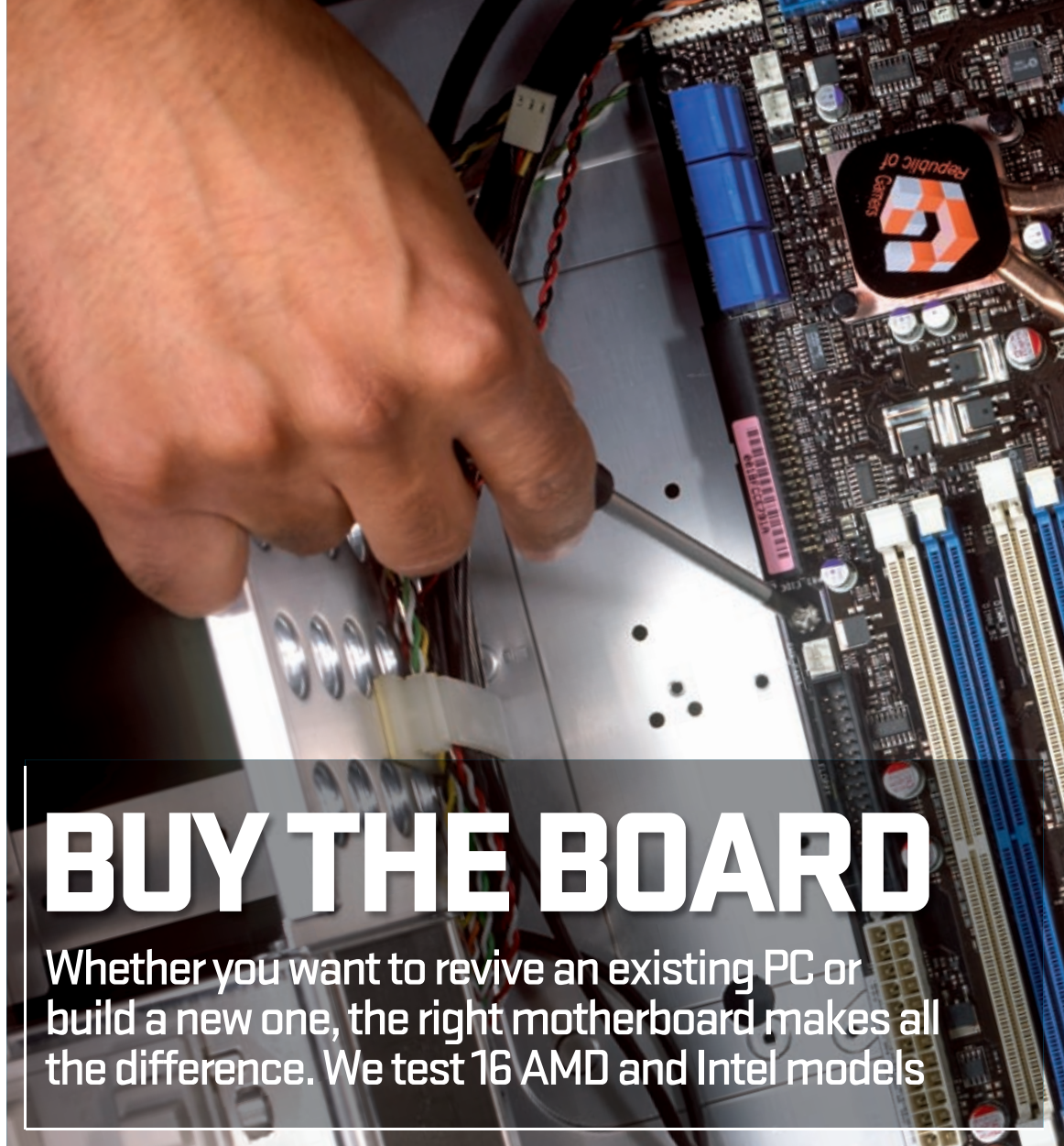


MOTHERBOARDS



BUY THE BOARD

Whether you want to revive an existing PC or build a new one, the right motherboard makes all the difference. We test 16 AMD and Intel models

INTRODUCTION

Every part of your PC connects to your motherboard. This determines what components you can fit, and how well each one performs. A new motherboard can give a fresh lease of life to an old PC, allowing you to transform its performance with the right processor and RAM upgrade. And if you're building a new PC, your choice of motherboard will play a key role in shaping the system you end up using.

We've tested 16 boards suitable for the latest AMD and Intel processors. We built a test PC from each one and put each through a series of demanding 2D and 3D tests. Whatever you want from your computer, we'll help you find the right motherboard for your needs and budget.

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Labs Manager



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Choosing a... Motherboard

It's important to do your research before buying a new motherboard. You must make sure it's compatible with the processor and memory you want to install, and that it has enough ports and upgrade slots for any hardware or expansion cards you want to plug in. You should look for a motherboard with many of the features you'll need already built in, so you can avoid spending money on upgrades. For example, many motherboards have high-specification sound chipsets, so you shouldn't need to fit a separate sound card.

SOCKET SCIENCE

The most basic decisions when buying a motherboard are the processor socket and board size required. There are two common board sizes, or form factors: full-size ATX or the smaller microATX. MicroATX boards allow you to choose a more compact case. ATX boards will only fit in full-size ATX cases, whereas microATX boards will fit in both microATX and ATX cases.

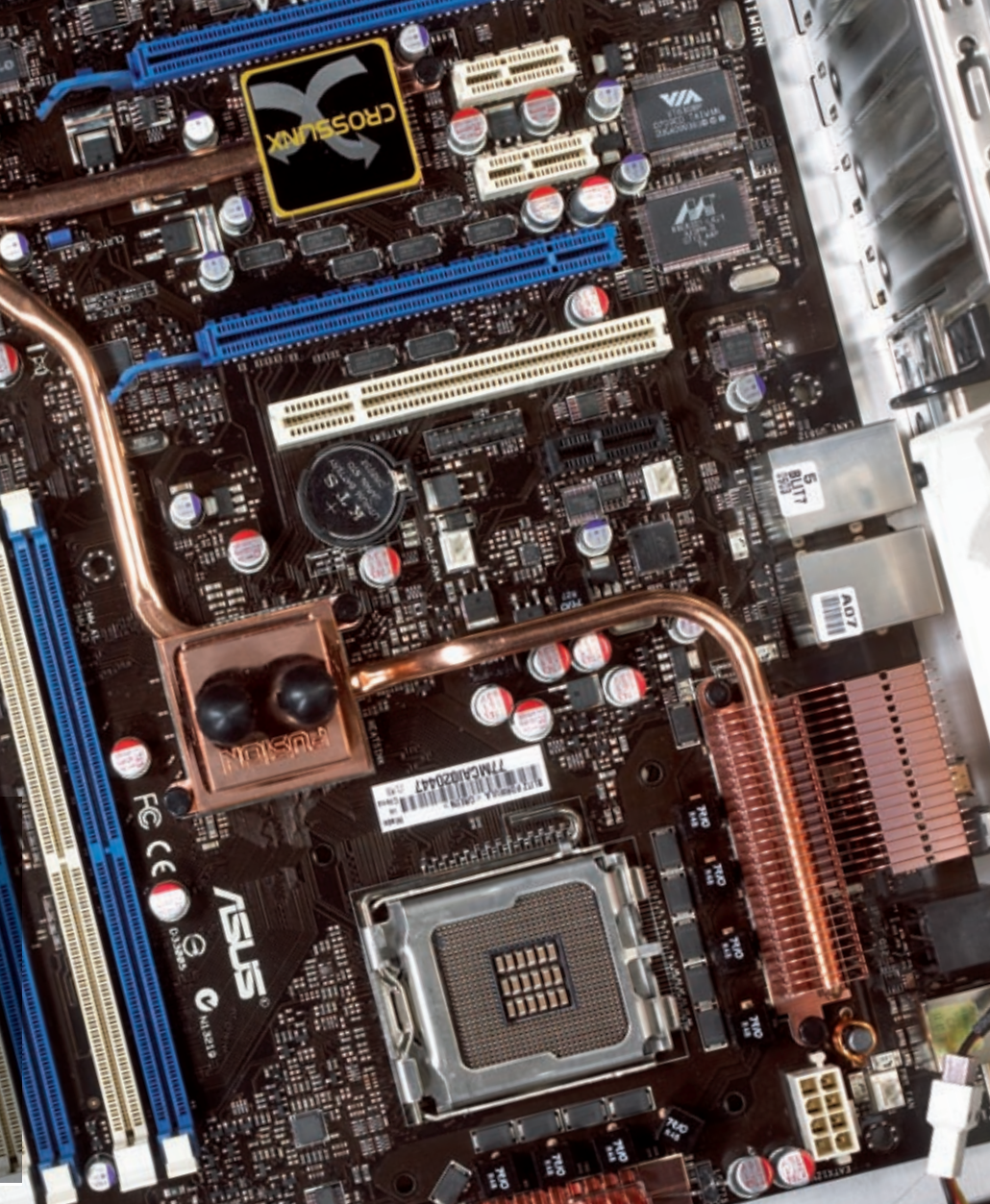
The processor socket you opt for largely determines which processors you can fit. Current AMD processors fit in Socket AM2 boards, while Intel processors need Socket LGA775. All the motherboards in this Labs will work with all current AMD and Intel processors.

If you're planning to fit some existing memory in your new motherboard, make sure it's the right type. All the motherboards in this group require DDR2 memory and support RAM that runs at up to 800MHz, otherwise known as PC2-6400.

ALL ON BOARD

Modern motherboards come with much of the hardware you need for a basic PC. All the motherboards in the group have 7.1 surround sound built in, while some have coaxial or optical outputs to connect to a surround-sound amplifier. They all have at least one Gigabit Ethernet port, and various quantities of USB2 ports for external peripherals. Not all the boards have FireWire ports, and many don't have serial or parallel ports for older modems or printers.

Even if a motherboard doesn't have enough USB2 ports or FireWire, serial or parallel connections on the rear panel, there may be appropriate 'headers' on the motherboard. These basic connectors can be wired up to brackets containing the proper ports. The brackets are often called backplates, because you install them at the rear of the case. Some motherboards have brackets in the box, but if those you need aren't included you can buy them from shops such as Maplin (www.maplin.com).



This month

AMD motherboards

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co.uk). Make sure your case has enough rear cutouts for the brackets you want to fit. Many cases have USB2 and FireWire ports built into the front of the case, which can also be connected to motherboard headers.

ROOM TO EXPAND

When a motherboard doesn't have the hardware you need on board, you'll need to buy an expansion card. Older expansion cards fit in PCI slots, while newer ones fit in small PCI Express x1 slots. Check the motherboard has enough free slots for the expansion cards you want to fit. Six of the motherboards in this month's Labs have integrated graphics chipsets. These are fine for Windows applications and very old games, but hopeless for new games or decoding high-definition video. Some integrated graphics motherboards have only analogue D-sub outputs, while others have both D-sub and digital DVI for newer monitors.

If you want to play games or your board doesn't have integrated graphics, you'll need a PCI Express graphics card. All the motherboards in the group have at least one of the requisite PCI Express x16 slots, while several have two, and one even has four. Among the AMD boards, Asus's M2N32-SLI Premium has two slots and lets you run two Nvidia graphics cards together for improved 3D performance, while MSI's P6N Diamond does the same for the Intel boards. Four Intel boards here support AMD's CrossFire

twin graphics card standard. You can also add a second graphics card to display Windows on up to four monitors.

DRIVE TIME

All the motherboards in the group have SATA II ports, as used by current hard disks and the latest optical drives. Most of the motherboards' chipsets also support RAID arrays. RAID combines hard disks to increase speed or to protect against data loss if a hard disk fails. All the motherboards with RAID support RAID 0 and RAID 1. RAID 0, known as striping, writes data to at least two drives alternately, speeding up access times, but

you lose all your data if one disk fails. RAID 1, known as mirroring, writes the same data to at least two disks, so there is no performance benefit but you won't lose data if one drive fails.

Some motherboards also support RAID 5.

This requires at least three disks, and while you lose the entire storage capacity of one disk the array can sustain the failure of a single disk without you losing any data. For details about RAID, see <http://en.wikipedia.org/wiki/RAID>. Finally, if you have older IDE hard disks or optical drives, check the motherboard has enough IDE connectors. One IDE connector can support up to two IDE hard disks or optical drives.

How we test Motherboards

Even though AMD and Intel motherboards take very different processors, we wanted our performance results to be as comparable as possible between the two types.

We tested the AMD motherboards with AMD's Athlon 64 X2 4200+ processor, and the Intel boards with Intel's Core 2 Duo E6300, because these have broadly similar performance in our application benchmarks. We also used identical 1GB pairs of Crucial PC2-6400 RAM and identical 80GB hard disks. If we had trouble getting the board to work or noted strange results, we updated

the motherboard's BIOS with the latest version from the manufacturer's website.

Each motherboard was put through our suite of 2D application benchmarks. We also ran our Call of Duty 2 and Prey game tests using our reference Radeon X1950 Pro graphics card. If the motherboards had integrated graphics, we tried to run our 3D benchmarks using the integrated graphics chipset as well as using the reference card, and checked whether the integrated graphics could play back high-definition video from a Blu-ray disc.

AMD MOTHERBOARDS

GIGABYTE GA-MA69VM-S2

★★★★★

£35 inc VAT

Gigabyte's GA-MA69VM-S2 is incredibly cheap. It has built-in Radeon X1200 graphics, which aren't quite as powerful as the X1250 chipsets on the ECS and Foxconn microATX AMD boards. As neither chipset can play current games or high-definition video, this doesn't make a difference. The main problem with the GA-MA69VM-S2 is that it doesn't have a DVI port for a digital connection to a modern monitor.

DVI output aside, there's not much missing from the specification. There are four DDR2 memory slots and four SATA II ports with support for RAID 0, 1 and 0+1 arrays. This was the fastest microATX AMD board in our application benchmarks with a score of 143. When we fitted it with our reference graphics card it managed 40fps in Call of Duty 2, which was near the top of the group.

This is a very cheap microATX motherboard with good all-round performance. The lack of a DVI port could be a problem, though.



AMD MOTHERBOARD AM2 socket, AMD 690V/AMD SB600 chipset, 4x DDR2 slots, 1x PCI Express x16 slot, no PCI Express x1 slots, 2x PCI slots, 1x IDE port, 4x SATA II ports PART CODE GA-MA69VM-S2 SUPPLIER www.lambda-tek.com DETAILS www.giga-byte.co.uk ☒ Good value; fast ☐ No DVI port

FOXCONN A690GM2MA

★★★★★

£38 inc VAT

Like the ECS and Gigabyte microATX motherboards, Foxconn's A690GM2MA has integrated graphics. The Radeon X1250 chipset is no good for current games, but it's fine for running 2D applications. The chipset's not powerful enough to decode high-definition video, so you will need a dedicated graphics card to build a media centre PC capable of playing HD-DVD or Blu-Ray films. There are D-sub and DVI outputs.

There are four SATA II ports and support for RAID 0, 1 and 0+1 arrays, plus four DDR2 memory slots. The board refused to boot with our standard DDR2 memory, but worked with a different set of modules. Two USB2 ports didn't work in the Vista installation program.

This was the slowest board overall in tests, but only just behind other microATX AMD boards. Gaming performance with our graphics card was good, with 40.4fps in Call of Duty 2.

This is an inexpensive motherboard, but ECS's AMD690GM-M2 gave us less trouble.



AMD MOTHERBOARD AM2 socket, AMD 690G/AMD SB600 chipset, 4x DDR2 slots, 1x PCI Express x16 slots, 1x PCI Express x1 slots, 2x PCI slots, 1x IDE ports, 4x SATA II ports PART CODE A690GM2MA-8KRS2H SUPPLIER www.lambda-tek.com DETAILS www.foxconnchannel.com ☒ Cheap; fast in games ☐ Memory compatibility problems

ECS AMD690GM-M2

★★★★★

£42 inc VAT



ECS's AMD690GM-M2 is an AMD microATX board. It uses AMD's 690G integrated graphics chipset and has both DVI and D-sub monitor outputs.

There are four SATA II ports, but a full-length PCI Express graphics card will obscure one of them. Like the Foxconn and Gigabyte integrated graphics boards, the AMD690GM-M2 supports RAID 0 and 1. There are just two memory slots, but each takes a 8GB module.

Performance in our 2D tests was like that of the other microATX AMD boards, with an overall score of 142. The integrated Radeon X1250 graphics couldn't run our 3D benchmarks at anywhere near playable frame rates, but the board was the second-fastest in Call of Duty 2 when fitted with our graphics card, with 41.4fps.

It doesn't have the compatibility problems of the A690GM2MA and unlike the GA-MA69VM-S2 (left) it has a DVI port. It's the best Socket AM2 microATX board in the group.



AMD MOTHERBOARD AM2 socket, AMD 690G/AMD SB600 chipset, 2x DDR2 slots, 1x PCI Express x16 slot, 1x PCI Express x1 slot, 2x PCI slots, 1x IDE port, 4x SATA II ports PART CODE AMD690GM-M2 SUPPLIER www.lambda-tek.com DETAILS www.ecs.com.tw ☒ Fast in games; DVI port ☐ Only two memory slots

FOXCONN N5M2AB-8KRS2H

★★★★★

£42 inc VAT

Like Gigabyte's GA-M55S-S3, Foxconn's N5M2AB uses Nvidia's nForce 550 chipset. This chipset lacks the RAID 5 support of the nForce 560 (see MSI's K9N Neo V3, opposite), but you can build a striped RAID 0 or mirrored RAID 1 array. There's a coaxial S/PDIF output to connect to certain surround-sound amplifiers, but no optical output. This is the only motherboard in the AMD group to use a fan to cool its Northbridge rather than a heatsink, so it makes more noise than most.

The N5M2AB's performance in our application benchmarks was average for an AMD motherboard, with an overall score of 142. Its gaming performance was poor, though. The board managed just 36.5fps in Call of Duty 2 with our reference graphics card, making it the second-slowest motherboard overall.

The N5M2AB-8KRS2H is an inexpensive motherboard, but it's slow in games. If you need RAID 5 support or an optical S/PDIF output, MSI's K9N Neo V3 and Gigabyte's GA-M55S-S3 respectively are better buys.



AMD MOTHERBOARD AM2 socket, Nvidia nForce 550 chipset, 4x DDR2 slots, 2x PCI Express x16 slots, 1x PCI Express x1 slot, 3x PCI slots, 1x IDE port, 4x SATA II ports PART CODE 020201U00-704-G SUPPLIER www.morecomputers.co.uk DETAILS www.foxconnchannel.com ☒ Inexpensive ☐ Slow in games; no passive Northbridge

GIGABYTE GA-M55S-S3

★★★★★

£47 inc VAT



Gigabyte's GA-M55S-S3 is one of three inexpensive AMD ATX boards in the group. Like Foxconn's N5M2AB, it uses Nvidia's nForce 550 chipset. This supports RAID 0 and 1, so you can build a striped or mirrored RAID array on the board's four SATA II ports. There's no RAID 5 support, though. There is plenty of room for expansion, with four PCI Express x1 slots and two PCI slots.

This board has a Realtek ALC883 sound chip. This has 7.1 surround-sound support and is one of only two AMD motherboards in the group with coaxial and optical digital outputs, so you should be able to connect it to most surround-sound amplifiers. Gigabyte's GA-M55S-S3 was only slightly slower than MSI's K9N Neo V3 in our application benchmarks, with 144 compared to 145. Its 3D performance was average, with 37.5fps in Call of Duty 2.

The GA-M55S-S3 has comprehensive surround-sound support and plenty of room for expansion. It's the best ATX AMD motherboard here.



AMD MOTHERBOARD AM2 socket, Nvidia nForce 550 chipset, 4x DDR2 slots, 1x PCI Express x16 slot, 4x PCI Express x1 slots, 2x PCI slots, 1x IDE port, 4x SATA II ports PART CODE GA-M55S-S3 SUPPLIER www.lambda-tek.com DETAILS www.giga-byte.co.uk ☒ Good value; lots of room for expansion ☐ Average performance

MSI K9N Neo V3

★★★★★

£47 inc VAT

MSI's K9N Neo V3 is a full-size ATX motherboard and uses Nvidia's nForce 560 chipset. Unlike the nForce 550-based boards from Foxconn and Gigabyte, the K9N Neo V3 can support a RAID 5 array on its four SATA II ports.

The K9N's Realtek ALC888 sound chipset doesn't have coaxial or optical S/PDIF outputs, so you can't connect it to a surround-sound amplifier and will have to use a PC speaker set for 7.1 surround sound. The board isn't hugely expandable, with two PCI Express x1 slots and two PCI slots, compared to the four PCI Express x1 slots on Gigabyte's GA-M55S-S3 board and three PCI slots on Foxconn's N5M2AB.

It was faster overall in our application benchmarks than Foxconn's and Gigabyte's ATX boards, with a score of 145. It was also quicker than both in Call of Duty 2 with 38.6fps, but this was still slower than the AMD 690 boards and Asus's M2N32-SLI Premium.

This is a fast board, but if you don't need RAID 5 support, Gigabyte's GA-M55S-S3 has more sound outputs and expansion slots.



AMD MOTHERBOARD AM2 socket, Nvidia nForce 560 chipset, 4x DDR2 slots, 1x PCI Express x16 slot, 2x PCI Express x1 slots, 2x PCI slots, 1x IDE port, 4x SATA II ports PART CODE MS-7369 SUPPLIER www.overclockers.co.uk DETAILS www.msi.com.tw ☒ Fast ☐ Not much room for expansion

MSI K9AG Neo2-Digital

★★★★

£90 inc VAT

MSI's K9AG Neo2-Digital is unusual in being a full-size integrated graphics board. It uses AMD's 690G chipset, which has a Radeon X1250 graphics chipset.

There are DVI and D-sub outputs and an HDMI port to connect to newer LCD TVs. The board doesn't have optical or coaxial S/PDIF outputs, so you can't connect to a home surround-sound amplifier. There are four SATA II ports and RAID 0, 1 and 0+1 support, as well as an eSATA port to connect a fast external drive. The overall score of 141 in our 2D benchmarks was similar to those of the microATX AMD boards, as it has the same chipset. The board was quick in Call of Duty 2 with our reference graphics card, with 41fps.

This board provides the convenience of integrated graphics with the extra expandability of a full-size form factor. For this price, however, you could buy the GA-M55S-S3 and a silent DirectX 10 graphics card such as Sapphire's HD2400XT, which plays high-definition video.

AMD MOTHERBOARD AM2 socket, AMD 690G/AMD SB600 chipset, 4x DDR2 slots, 1x PCI Express x16 slot, 2x PCI Express x1 slots, 3x PCI slots, 1x IDE port, 4x SATA II ports PART CODE MS-7368

SUPPLIER www.ebuyer.com DETAILS www.msi.com.tw
 Fast; HDMI port; SATA port; fast in games Expensive



ASUS M2N32-SLI Premium

★★★★

£111 inc VAT

Asus's M2N32-SLI Premium is the most expensive AMD board here, but it is packed with features. Other AMD boards in the group have two PCI Express x16 graphics card slots, but this is the only one to support Nvidia's SLI dual graphics card standard.

Its Nvidia 590SLI chipset can run both graphics card slots at full x16 speed, so you shouldn't have any bottlenecks. A second full-length card will block two SATA ports, though. The board supports up to six SATA II drives in a RAID 0, 1, 0+1 or 5 array on one controller, and you can create a RAID 0 or 1 array with one internal SATA II and an external eSATA drive.

We had trouble getting the board to run our application benchmarks under Vista, as our reference DVD codec refused to work. Under XP, it ran the 2D benchmarks fine, producing a score of 148, the best from any AMD board.

This has a comprehensive specification, but if you don't need SLI go for the GA-M55S-S3.

AMD MOTHERBOARD AM2 socket, Nvidia nForce 590 SLI MCP chipset, 4x DDR2 slots, 2x PCI Express x16 slots, 1x PCI Express x1 slot, 2x PCI slots, 1x IDE port, 7x SATA II ports PART CODE 90-MIB04P-G0EAY00Z

SUPPLIER www.kikatek.com DETAILS www.asus.com.tw
 Fast; comprehensive specification; eSATA port Expensive



Labs verdict AMD motherboards

If you want to build an AMD Socket AM2 PC there are several cheap boards to choose from. We tested four under £45, and each provides adequate performance, features and connections to build a PC for Windows and 2D application use. ECS's AMD690GM-M2 is the best value. It may not be able to play games or high-definition video, but it's fast in 2D applications and has all the modern connectors you'd want.

If you want to fit two graphics cards and overclock components for the best games performance, Asus's M2N32-SLI Premium has everything you need, but it costs £111. If you are happy with one graphics card then Gigabyte's GA-M55S-S3 provides the expandability of a full-size ATX motherboard for far less. It has optical as well as coaxial surround-sound outputs and support for striped or mirrored RAID arrays, plus four PCI Express x1 slots for expansion cards, all for £47. It's our Best Buy Socket AM2 board.



ECS
AMD690GM-M2
 ★★★★★



GIGABYTE
GA-M55S-S3
 ★★★★★



MANUFACTURER	GIGABYTE	FOXCONN	ECS	FOXCONN	GIGABYTE	MSI	MSI	ASUS
Model	GA-MA69VM-S2	A690GM2MA	AMD690GM-M2	NSM2AB-8KRS2H	GA-M55S-S3	K9N Neo V3	K9AG Neo2-Digital	M2N32-SLI Premium
Rating	★★★★	★★★	★★★★★	★★★★	★★★★★	★★★★	★★★	★★★
Socket	AM2	AM2	AM2	AM2	AM2	AM2	AM2	AM2
Form factor	MicroATX	MicroATX	MicroATX	ATX	ATX	ATX	ATX	ATX
Dimensions	244x244mm	244x244mm	244x244mm	305x245mm	305x234mm	305x200mm	305x210mm	305x245mm
Processor support	Sempron, Athlon 64, Athlon 64 X2, Athlon 64 FX	Sempron, Athlon 64, Athlon 64 X2, Athlon 64 FX	Sempron, Athlon 64, Athlon 64 X2, Athlon 64 FX	Sempron, Athlon 64, Athlon 64 X2, Athlon 64 FX	Sempron, Athlon 64, Athlon 64 X2, Athlon 64 FX	Sempron, Athlon 64, Athlon 64 X2, Athlon 64 FX	Sempron, Athlon 64, Athlon 64 X2	Sempron, Athlon 64, Athlon 64 X2, Athlon 64 FX
Processor external bus	200MHz (1,000MHz HyperTransport)	200MHz (1,000MHz HyperTransport)	200MHz (1,000MHz HyperTransport)	200MHz (1,000MHz HyperTransport)	200MHz (1,000MHz HyperTransport)	200MHz (1,000MHz HyperTransport)	200MHz (1,000MHz HyperTransport)	200MHz (1,000MHz HyperTransport)
Northbridge chipset	AMD 690V	AMD 690G	AMD 690G	Nvidia nForce 550	Nvidia nForce 550	Nvidia nForce 560	AMD 690G	Nvidia nForce 590 SLI MCP
Southbridge chipset	AMD SB600	AMD SB600	AMD SB600	Nvidia nForce 550	Nvidia nForce 550	Nvidia nForce 560	AMD SB600	Nvidia nForce 590 SLI MCP
Passively cooled Northbridge	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Integrated graphics	ATI Radeon X1200	ATI Radeon X1250	ATI Radeon X1250	None	None	None	ATI Radeon X1250	None
Maximum memory speed	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400
Memory slots	4	4	2	4	4	4	4	4
Maximum memory	16GB	8GB	16GB	4GB	16GB	8GB	8GB	8GB
INTERNAL PORTS								
Power connectors	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX, 1x four-pin Molex	1x 24-pin ATX, 1x four-pin ATX, 1x four-pin Molex	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX
PCI Express x16	1	1	1	2	1	1	1	2
Dual graphics architecture	None	None	None	None	None	None	None	SLI 16x
PCI Express x1/x4	0/1	1/0	1/0	1/0	4/0	2/0	2/0	1/1
PCI slots	2	2	2	3	2	2	3	2
Fan headers	2	2	2	4	3	3	3	7
Floppy disk/IDE	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
SATA	4	4	4	4	4	4	4	7
RAID chipset (maximum disks)	AMD SB600 (4x SATA II, RAID 0, 1, 0+1)	AMD SB600 (4x SATA II, RAID 0, 1, 0+1, JBOD)	AMD SB600 (4x SATA II, RAID 0, 1, 10)	Nvidia nForce 550 (4x SATA II, RAID 0, 1, 0+1)	Nvidia nForce 550 (4x SATA II, RAID 0, 1, 0+1)	Nvidia nForce 560 (4x SATA II, RAID 0, 1, 0+1, 5, JBOD)	AMD SB600 (4x SATA II, RAID 0, 1, 0+1)	Nvidia nForce 590 SLI MCP (6x SATA II, RAID 0, 1, 0+1, 5, JBOD), Silicon Image 3132 (1x SATA II, 1x eSATA, RAID 0, 1, JBOD)
FEATURES								
Network	10/100/1,000	10/100/1,000	10/100/1,000	10/100/1,000	10/100/1,000	10/100/1,000	10/100/1,000	2x 10/100/1,000
Sound (ports)	Realtek ALC888 (6x analogue)	Realtek ALC883 (6x analogue)	Realtek ALC883 (6x analogue)	Realtek ALC888 (coaxial S/PDIF out, 6x analogue)	Realtek ALC883 (coaxial/optical out, 6x analogue)	Realtek ALC888 (6x analogue)	Realtek ALC888 (6x analogue)	SoundMAX ADI AD1988B (optical/coaxial S/PDIF out, 6x analogue)
USB2 ports/headers	4/3	4/3	4/3	4/3	4/3	4/3	4/3	4/2
FireWire ports/headers	None	None	None	None	1/2	None	1/2	1/1
Legacy ports	Parallel, serial	Parallel, serial header	Serial header	Parallel, serial	Parallel, serial	Parallel, serial	Serial header	Serial, parallel header
Other ports	1x DVI, 1x D-sub	1x DVI, 1x D-sub	1x DVI, 1x D-sub	None	None	None	1x DVI, 1x D-sub, 1x eSATA	1x eSATA
Cables included	2x SATA, 1x IDE, 1x floppy	1x SATA, 1x IDE, 1x floppy	1x SATA, 1x IDE	1x SATA, 1x IDE, 1x floppy	1x SATA, 1x IDE, 1x floppy	1x SATA, 1x IDE, 1x floppy	1x SATA, 1x IDE	6x SATA, 1x IDE, 1x floppy
Brackets included	None	None	1x serial	None	None	None	None	1x USB2
Software included	Norton Internet Security 2006	None	None	None	Norton Internet Security 2006	None	None	InterVideo MediaOne Gallery, Ulead PhotoImpact 12 SE, CyberLink PowerBackup, Corel Snapfire Plus SE
SETUP AND OVERCLOCKING								
BIOS	Award	AMI	Phoenix	Phoenix	Award	AMI	AMI	Phoenix
Voltage adjustment	None	RAM/chipset	CPU/RAM	CPU/RAM/chipset	CPU/RAM/chipset	CPU/RAM	CPU/RAM	CPU/RAM/chipset
CPU clock maximum adjustment	N/A	400MHz	232MHz	400MHz	500MHz	300MHz	500MHz	425MHz
BUYING INFORMATION								
Price including VAT	£35	£38	£42	£42	£47	£47	£90	£111
Supplier	www.lambda-tek.com	www.lambda-tek.com	www.lambda-tek.com	www.morecomputers.co.uk	www.lambda-tek.com	www.overclockers.co.uk	www.ebuyer.com	www.kikatek.com
Details	www.giga-byte.co.uk	www.foxconnchannel.com	www.ecs.com.tw	www.foxconnchannel.com	www.giga-byte.co.uk	www.msi.com.tw	www.msi.com.tw	www.asus.com.tw
Part code	GA-MA69VM-S2	A690GM2MA-8KRS2H	AMD690GM-M2	020201U00-704-G	GA-M55S-S3	MS-7369	MS-7368	90-MIB04P-G0EAY00Z

INTEL MOTHERBOARDS

GIGABYTE GA-G33M-DS2R

★★★★★

£71 inc VAT

Gigabyte's GA-G33M-DS2R has Intel G33 Express integrated graphics. These weren't powerful enough to run our 3D benchmarks and couldn't decode high-definition video without dropping frames. You'll need a dedicated PCI Express graphics card to play games or watch high-definition films.

It has six SATA II ports and support for RAID 0, 1, 5, and 10. There are no PCI Express x1 slots, but PCI Express x1 cards fit in the board's PCI Express x4 or x16 slots. The x4 slot isn't closed at the back, so you can fit a second PCI Express x16 graphics card, though it'll run only at x4 speed. You can run four displays or two AMD Radeon cards in a CrossFire configuration.

An eSATA bracket and external eSATA power cable are included; you can use a 3½in internal SATA hard disk as external storage. The board was slower than Foxconn's and MSI's microATX boards in our application benchmarks, but 3D performance was average for the group.

This board supports up to four monitors and CrossFire and is ideal for integrated graphics.



INTEL MOTHERBOARD LGA775 socket, Intel G33 Express/Intel ICH9R chipset, 4x DDR2 slots, 1x PCI Express x16 slot, no PCI Express x1 slots, 2x PCI slots, 1x IDE port, 6x SATA II ports PART CODE GA-G33M-DS2R

SUPPLIER www.scan.co.uk DETAILS www.giga-byte.co.uk

✓ Good value; eSATA port; CrossFire support

MSI G33M

★★★★

£73 inc VAT

While the other two Intel microATX motherboards in the group use Intel's G33 Express Northbridge chipset and ICH9R Southbridge, this has a lower-specification ICH9 Southbridge, which doesn't support RAID. You would have to buy a RAID expansion card to build a RAID array with this motherboard.

MSI's G33M also omits any legacy serial or parallel ports or headers, so you can't use older modems and printers with it. It does have six USB2 ports, though, and two eSATA ports. Unlike Gigabyte's GA-G33M-DS2R, there is no external eSATA power connector, so your eSATA drive needs to be mounted in a powered enclosure.

This was the fastest microATX motherboard in our 2D tests and fourth overall with 148. It was fairly slow in our 3D tests with our reference graphics card, coming bottom of the Call of Duty 2 benchmark with 35.5fps.

MSI's G33M is fast in 2D applications, but the lack of RAID support or legacy ports counts against it. Gigabyte's GA-G33M-DS2R is a better value microATX Intel motherboard.



INTEL MOTHERBOARD LGA775 socket, Intel G33 Express/Intel ICH9R chipset, 4x DDR2 slots, 1x PCI Express x16 slot, 1x PCI Express x1 slot, 2x PCI slots, 1x IDE port, 3x SATA II ports PART CODE MS-7357

SUPPLIER www.lambda-tek.com DETAILS www.msi.com.tw

✓ Fast; eSATA port ✗ No RAID support

GIGABYTE P35-DS3R

★★★★★

£76 inc VAT



Gigabyte's P35-DS3R is the cheapest ATX motherboard in the Intel group.

While most other ATX boards in the group use Intel's P35 chipset, this board uses the P35 Express chipset. The chief difference is that the P35-DS3R doesn't have twin PCI Express x16 graphics card slots.

Second graphics card slot aside, there's not much missing from the P35-DS3R. There's plenty of room for expansion, with three PCI Express x1 and three PCI slots. There are also eight SATA II ports, six of which can be made into a RAID 0, 1, 5 or 10 array on one controller, while the other two are on a separate controller and can form a RAID 0 or 1 array.

This board has optical and coaxial S/PDIF outputs, and comes with an eSATA data and power bracket, so you can connect a standard internal hard disk externally. The P35-DS3R was one of the fastest motherboards in our 2D tests, scoring 150.

This has a comprehensive specification and is very good value. It's our Budget Buy.



INTEL MOTHERBOARD LGA775 socket, Intel P35 Express/Intel ICH9R chipset, 4x DDR2 slots, 1x PCI Express x16 slot, 3x PCI Express x1 slots, 3x PCI slots, 1x IDE port, 8x SATA II ports PART CODE GA-P35-DS3R

SUPPLIER www.scan.co.uk DETAILS www.giga-byte.co.uk

✓ Good value; fast; eSATA port ✗ One graphics card slot

FOXCONN G33M-S

★★★★

£81 inc VAT

Foxconn's G33M-S is one of three Intel microATX motherboards in the group. It uses Intel's G33 Express chipset and has integrated graphics. Like the other Intel microATX boards, there's just one D-sub and no DVI video output.

Unlike MSI's G33M, this board has an Intel ICH9R rather than ICH9 Southbridge chipset. This means it has RAID support, and you can build a RAID 0, 1, 0+1 or 5 array over its four SATA II ports. It's the only board in the group without a floppy disk port, so you'll need a USB floppy drive if you want to update the BIOS. There are six USB2 ports, but you'll need to fit the supplied bracket to use FireWire.

The G33 Express integrated graphics couldn't run our Call of Duty 2 benchmark and Prey wouldn't render its graphics properly. But when we fitted our reference graphics card, the G33M-S became the fastest Intel board in Call of Duty 2, with 37.9fps. The 2D performance was average for the Intel microATX group.

This G33M-S is a fairly pricy microATX board and the lack of floppy port may be a problem. The GA-G33M-DS2R is better value.



INTEL MOTHERBOARD LGA775 socket, Intel G33 Express/Intel ICH9R chipset, 4x DDR2 slots, 1x PCI Express x16 slot, 1x PCI Express x1 slot, 2x PCI slots, 1x IDE port, 4x SATA II ports PART CODE 020108G00-500-G

SUPPLIER www.cclonline.co.uk

DETAILS www.foxconnchannel.com

✓ Fast in games ✗ Fairly expensive, no floppy port

ECS P35T-A

★★★★

£105 inc VAT

ECS's P35T-A is the cheapest motherboard with Intel's P35 chipset. It has two graphics card slots, and you can fit two ATI cards in a CrossFire configuration. There's not enough room between the slots for high-end ATI HD2900XT cards, and the second slot will run only at 4x speed, which would hamper the performance of high-end cards at high detail settings.

The ECS P35T-A is a fairly inexpensive motherboard, but it has a basic specification. There are six SATA II ports, but the Intel ICH9 Southbridge chipset doesn't support RAID. It's also the only full-size ATX motherboard with no coaxial or optical S/PDIF outputs.

The motherboard also had some trouble with our reference DDR2 memory, but was fine with a second set of modules. The board was fast in our application benchmarks, coming equal-third overall with a score of 150.

This motherboard is inexpensive and fast, but has a cut-down specification. Gigabyte's P35-DS3R is a better bet if you don't need two graphics cards slots.



INTEL MOTHERBOARD LGA775 socket, Intel P35/Intel ICH9R chipset, 4x DDR2 slots, 2x PCI Express x16 slots, 1x PCI Express x1 slot, 3x PCI slots, 1x IDE port, 6x SATA II ports PART CODE P35T-A

SUPPLIER www.advancetec.co.uk DETAILS www.ecs.com.tw

✓ Fast, inexpensive; eSATA port; CrossFire support

✗ No RAID support; memory compatibility problems

ABIT IP35 Pro

★★★★★

£122 inc VAT



Abit's IP35 Pro is very easy to set up. It has power and reset buttons on the board, so you don't have to plug it into your case to test it, as well as an LCD error display for troubleshooting.

There are six SATA II ports on the board, and you can create a RAID 0, 1, or 5 array across the ports. There are also two eSATA ports, and you can set up your eSATA drives as a RAID 0 or 1 array. You don't get the external SATA power connector provided with Gigabyte's P35-DS3R, so your eSATA drives will need to be mounted in enclosures with their own power supplies.

There are two full-length PCI Express graphics card slots, one of which runs at x16 speed and one at x4 speed, and enough room between them for two double-slot AMD HD2900XT graphics cards. The slower x4 slot would reduce the performance of the second card at high detail settings, though. The board came second in our 2D benchmarks with 151.

The IP35 Pro is easy to set up and fast. It's our Best Buy ATX Intel motherboard.



INTEL MOTHERBOARD LGA775 socket, Intel P35/Intel ICH9R chipset, 4x DDR2 slots, 2x PCI Express x16 slots, 1x PCI Express x1 slot, 3x PCI slots, 1x IDE port, 6x SATA II ports PART CODE IP35PUCD000251

SUPPLIER www.yoyotech.co.uk

DETAILS www.abit.com.tw

✓ Fast; eSATA port; Easy to set up; CrossFire support

ASUS Blitz Formula

★★★★★

£164 inc VAT



Asus's Blitz Formula is an enthusiast's motherboard. It comes with connectors to plumb the Northbridge into a water-cooling system. There's an external switch to reset the CMOS. The BIOS itself has the largest number of overclocking options we've ever seen.

This board has two graphics card slots and its CrossLink technology means the second PCI Express slot can run at 8x speed rather than the 4x of the other Intel P35-based boards. This alleviates bottlenecks that affect a standard Intel P35 board when using two graphics cards in a CrossFire configuration. With two Radeon HD2900XT graphics cards fitted, our games tests ran 12 per cent faster than on an Intel P35 board with the same graphics configuration.

If you want a CrossFire PC with high-end graphics cards this has everything you need, but most people would prefer the P35-DS3R.

INTEL MOTHERBOARD LGA775, Intel P35/Intel ICH9R chipset, 4x DDR2 slots, 2x PCI Express x16 slots, 3x PCI Express x1 slots, 2x PCI slots, 1x IDE port, 6x SATA II ports
PART CODE 90-MBB6H0-G0UAY00Z
SUPPLIER www.eclipsecomputers.com
DETAILS www.asus.com.tw

✓ Fast in CrossFire mode; comprehensive overclocking
✗ Expensive

MSI P6N Diamond

★★★

£200 inc VAT

MSI's P6N Diamond has four PCI Express x16 slots, so you could fit four graphics cards and have eight monitors. You could also fit two Nvidia graphics cards in an SLI configuration. As the first two PCI Express slots run at full x16 speed, there wouldn't be a bottleneck with even the fastest cards.

The P6N is noisy, due to a high-speed fan on the Northbridge. We had a few problems setting up the motherboard. The sound chipset drivers supplied in the box wouldn't install under Vista and crashed the system. A new set of drivers from the MSI website installed fine, but we experienced the occasional crash when running our benchmarks. Still, the Diamond was quick, coming top of our application benchmarks with an overall score of 152.

This is a highly specified motherboard. The onboard Creative Sound Blaster X-Fi Extreme is high quality. However, the P6N Diamond is expensive and too unstable to recommend.

INTEL MOTHERBOARD LGA775 socket, Nvidia nForce 680i SLI (C55XE)/Nvidia nForce 590i SLI (MCP55XE) chipset, 4x DDR2 slots, 4x PCI Express x16 slots, 1x PCI Express x1 slot, 2x PCI slots, 1x IDE port, 7x SATA II ports
PART CODE MS-7320 SUPPLIER www.ebuyer.com
DETAILS www.msi.com.tw

✓ Fast; eSATA port ✗ Expensive, stability problems

Labs verdict Intel motherboards

The Intel motherboards here are pricier than their AMD counterparts, but there are still bargains to be had. If you want a PC with integrated graphics for general Windows use, Gigabyte's GA-G33M-DS2R is the board to buy. It's fast, has comprehensive RAID support and sound outputs, and can support two graphics cards.

If you're after a full-size Intel board on a budget, Gigabyte's P35-DS3R may not support twin graphics cards but it has few other missing features and strong 2D performance. It's our Budget Buy.

If you need two graphics card slots, Abit's IP35 Pro is the best board here. It's quick and well designed, and wins a Best Buy award. Finally, for the ultimate in Intel overclocking, consider Asus's Blitz Formula, our Most Wanted Intel motherboard.



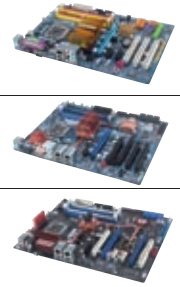
**GIGABYTE
P35-DS3R**
★★★★★



**ABIT
IP35 Pro**
★★★★★



**ASUS
Blitz Formula**
★★★★★



			BUDGET BUY			BEST BUY		MOST WANTED	
MANUFACTURER	GIGABYTE	MSI	GIGABYTE	FOXCONN	ECS	ABIT	ASUS	MSI	
Model	GA-G33M-DS2R	G33M	P35-DS3R	G33M-S	P35T-A	IP35 Pro	Blitz Formula	P6N Diamond	
Rating	★★★★★	★★★	★★★★★	★★★★	★★★★	★★★★★	★★★★★	★★	
Socket	LGA775	LGA775	LGA775	LGA775	LGA775	LGA775	LGA775	LGA775	
Form factor	MicroATX	MicroATX	ATX	MicroATX	ATX	ATX	ATX	ATX	
Dimensions	244x244mm	244x244mm	305x210mm	244x244mm	305x245mm	305x245mm	305x245mm	305x245mm	
Processor support	Celeron D, Pentium 4, Pentium D, Core 2 Duo, Quad, Extreme	Celeron D, Pentium 4, Pentium D, Core 2 Duo, Quad, Extreme	Celeron D, Pentium 4, Pentium D, Core 2 Duo, Quad, Extreme	Celeron D, Pentium 4, Pentium D, Core 2 Duo, Quad, Extreme	Celeron D, Pentium 4, Pentium D, Core 2 Duo, Quad, Extreme	Pentium 4, Pentium D, Pentium Extreme, Core 2 Duo, Quad, Extreme Edition	Celeron D, Pentium 4, Pentium D, Core 2 Duo, Quad, Extreme	Pentium D, Pentium Extreme, Core 2 Duo, Quad, Extreme Edition	
Processor external bus	333MHz (1,333MHz quad-pumped)	333MHz (1,333MHz quad-pumped)	333MHz (1,333MHz quad-pumped)	333MHz (1,333MHz quad-pumped)	333MHz (1,333MHz quad-pumped)	333MHz (1,333MHz quad-pumped)	333MHz (1,333MHz quad-pumped)	333MHz (1,333MHz quad-pumped)	
Northbridge chipset	Intel G33 Express	Intel G33 Express	Intel P35 Express	Intel G33 Express	Intel P35	Intel P35	Intel P35	Nvidia nForce 680i SLI	
Southbridge chipset	Intel ICH9R	Intel ICH9	Intel ICH9R	Intel ICH9R	Intel ICH9	Intel ICH9R	Intel ICH9R	Nvidia nForce 590i SLI	
Passively cooled Northbridge	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
Integrated graphics	Intel G33 Express	Intel G33 Express	None	Intel G33 Express	None	None	None	None	
Memory type supported	DDR2	DDR2	DDR2	DDR2	DDR2	DDR2	DDR2	DDR2	
Maximum memory speed	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400	PC2-6400	
Memory slots	4	4	4	4	4	4	4	4	
Maximum memory	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	
Dual channel support	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
INTERNAL PORTS									
Power connectors	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX	1x 24-pin ATX, 1x four-pin ATX, 1x four-pin Molex	1x 24-pin ATX, 1x eight-pin ATX	1x 24-pin ATX, 1x eight-pin ATX	1x 24-pin ATX, 1x eight-pin ATX	
PCI Express x16	1	1	1	1	2	2	2	4	
Dual graphics architecture	CrossFire	None	None	None	CrossFire	CrossFire	CrossFire	SLI 16x	
PCI Express x1/x4	0/1	1/0	3/0	1/0	1/0	1/0	3/0	1/0	
PCI slots	2	2	3	2	3	3	2	2	
Fan headers	2	2	4	2	3	6	8	4	
Floppy disk/IDE	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	
SATA	6	3	8	4	6	6	6	7	
RAID chipset (maximum disks)	Intel ICH9 (6x SATA II, RAID 0, 1, 5, 10)	None	Intel ICH9R (6x SATAII, RAID 0, 1, 5, 10), Gigabyte (2x SATAII, RAID 0, 1, JBOD)	Intel ICH9R (4x SATAII, RAID 0, 1, 0+1, 5)	None	Intel ICH9R (6x SATAII, RAID 0, 1, 5, 10), Jmicron JMB363 (2x eSATA, RAID 0, 1, JBOD)	Intel ICH9R (6x SATA II, RAID 0, 1, 5, 10, JBOD)	Nvidia nForce 590i SLI (5x SATA II, RAID 0, 1, 0+1, 5, JBOD), SiI4723 (2x SATA II, RAID 0, 1)	
FEATURES									
Network	10/100/1,000	10/100/1,000	10/100/1,000	10/100/1,000	10/100/1,000	2x 10/100/1,000	2x 10/100/1,000	2x 10/100/1,000	
Sound (ports)	Realtek ALC889A (6x analogue)	Realtek ALC888 (6x analogue)	Realtek ALC889A (optical/coaxial S/PDIF in/out, 6x analogue)	Realtek ALC888 (6x analogue)	Realtek ALC883 (6x analogue)	Realtek ALC888 (optical in/out, 6x analogue)	ADI 1988B (optical/coaxial S/PDIF out, 6x analogue)	Creative Sound Blaster X-Fi XtremeAudio (optical/coaxial S/PDIF out, 6x analogue)	
USB2 ports/headers	4/4	6/3	4/4	6/3	6/3	4/4	4/3	4/2	
FireWire ports/headers	1/2	1/1	None	0/2	None	0/2	1/1	1/1	
Legacy ports	Parallel, serial	None	Parallel, serial	Parallel, serial	Serial, parallel header	None	None	Serial header	
Other ports	1x D-sub	2x eSATA, 1x D-sub	None	1x D-sub	1x eSATA	2x eSATA	None	1x eSATA	
Cables included	2x SATA, 1x IDE, 1x floppy, 1x eSATA, 1x eSATA power	1x SATA, 1x IDE	3x SATA II, 1x IDE, 1x floppy, 1x eSATA power	1x SATA	1x SATA, 1x IDE	6x SATA, 1x IDE, 1x floppy	6x SATA, 1x IDE, 1x floppy	6x SATA, 1x IDE, 1x floppy	
Brackets included	1x eSATA	None	1x eSATA	1x FireWire	None	1x USB2, 1x FireWire	1x USB2, 1x FireWire	1x USB2, 1x FireWire	
Software included	Norton Internet Security 2007	None	Norton Internet Security 2007	None	None	None	STALKER, CyberLink PowerBackup, Ulead PhotoImpact 12 SE	None	
SETUP AND OVERCLOCKING									
BIOS	Award	AMI	Award	AMI	AMI	Phoenix	AMI	AMI	
Voltage adjustment	CPU/RAM/chipset	CPU/RAM/chipset	CPU/RAM/chipset	CPU/RAM/chipset	CPU/RAM/chipset	CPU/RAM/chipset	CPU/RAM/chipset	CPU/RAM/chipset	
CPU clock maximum adjustment	700MHz	600MHz	700MHz	750MHz	500MHz	600MHz	800MHz	833MHz	
BUYING INFORMATION									
Price including VAT	£71	£73	£76	£81	£105	£122	£164	£200	
Supplier	www.scan.co.uk	www.lambda-tek.com	www.scan.co.uk	www.cclonline.co.uk	www.advancetec.co.uk	www.yoyotech.co.uk	www.eclipsecomputers.com	www.ebuyer.com	
Details	www.giga-byte.co.uk	www.msi.com.tw	www.giga-byte.co.uk	www.foxconnchannel.co.uk	www.ecs.com.tw	www.abit.com.tw	www.asus.com.tw	www.msi.com.tw	
Part code	GA-G33M-DS2R	MS-7357	GA-P35-DS3R	020108G00-500-G	P35T-A	IP35PCD000251	90-MBB6H0-G0UAY00Z	MS-7320	

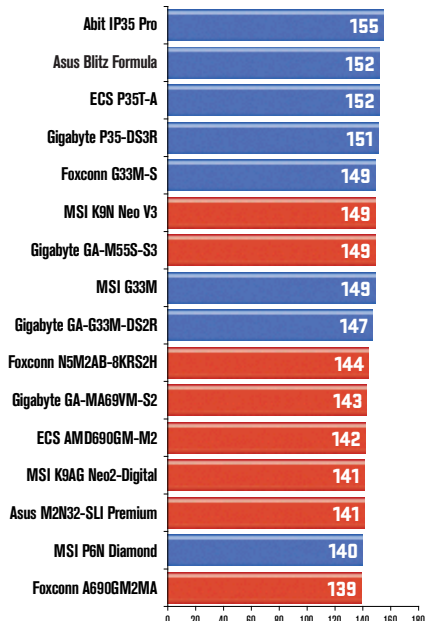
BENCHMARKS

Socket AM2

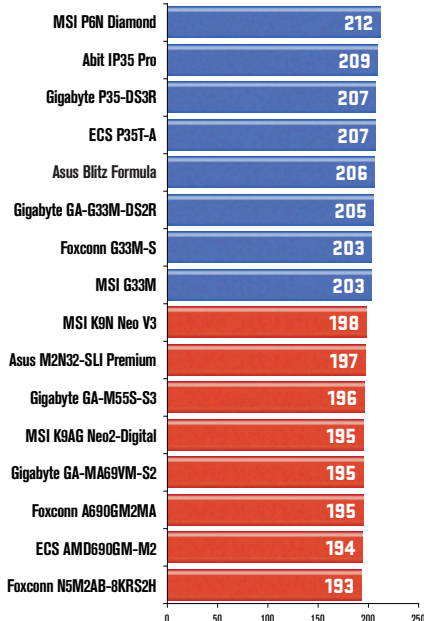
Socket LGA775

2D Performance *Shopper application tests*

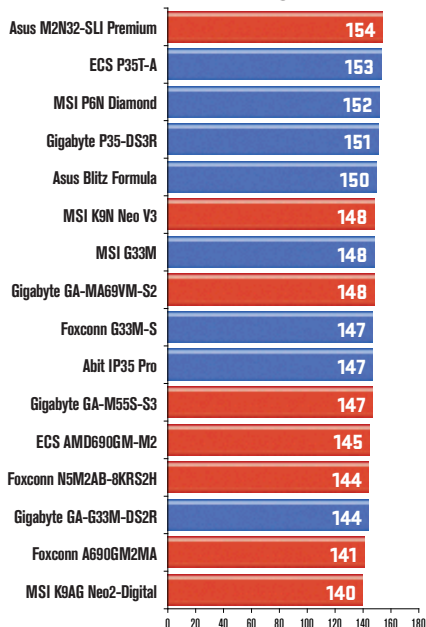
Image-Editing



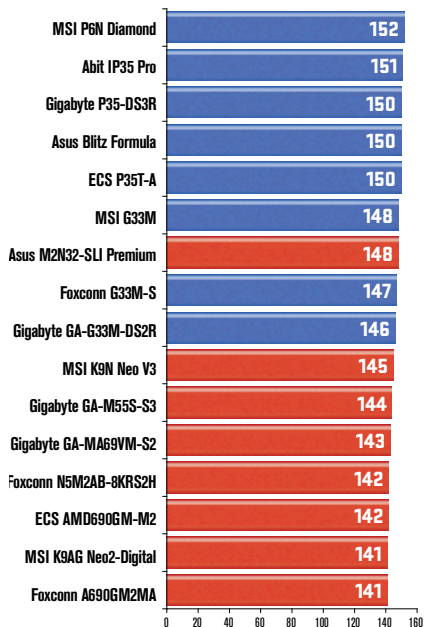
Video-Encoding



Multitasking



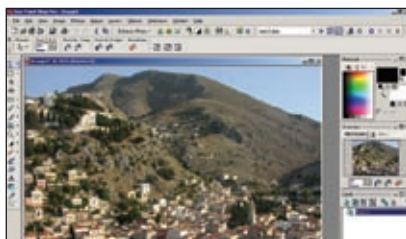
Overall



Computer Shopper's 2D benchmarks have been designed to show how PCs stand up to the toughest tasks Windows can throw at them. Today's PCs have no problem running office applications such as Word and Excel, so we have chosen to focus our tests on areas where you could experience difficulties.

Encoding a short video to MPEG2 format is a processor-intensive task that anyone transferring home videos to DVD will have to tackle. Our image-editing test simulates a session of photo enhancement using Paint Shop Pro X. In our third test, a set of audio files is ripped to MP3 format.

Finally, we have a multitasking test designed to test the benefits of HyperThreaded and dual-core processors. This test compresses

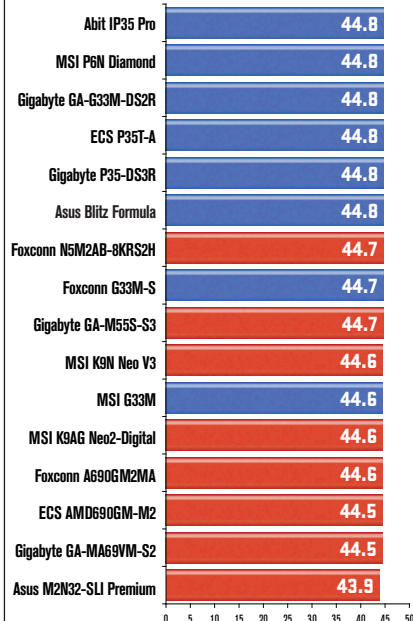


SETTINGS We run our application tests at 1,280x1,024 resolution and in 32-bit colour
WEB www.computershopper.co.uk

a DVD at the same time as running our image-editing test. Figures are relative to a reference Evesham Athlon 64 3500+, which scores 100 in all tests.

3D Performance *Games*

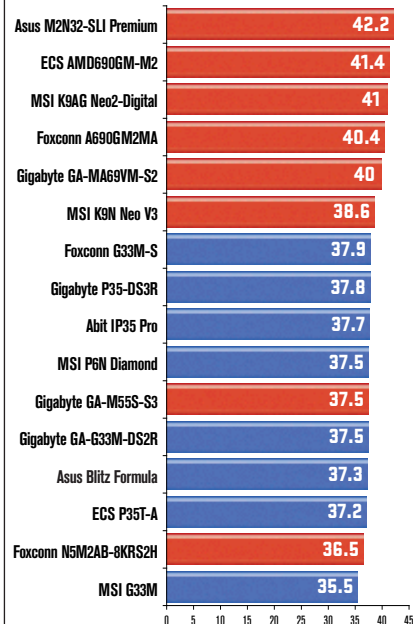
Prey (fps)



SETTINGS 1,280x1,024 resolution, 4x AA, Anisotropic filtering
WEB www.prey.com

Our Prey benchmark tests whether a motherboard has the power needed to play cutting-edge 3D games. A good score here indicates that a motherboard should cope with graphically intense 3D games.

Call of Duty 2 (fps)



SETTINGS 1,280x1,024 resolution, 32-bit colour, default settings
WEB www.futuremark.com

Call of Duty 2 uses DirectX and is one of the most demanding games available at the moment. With a wide range of effects and frenetic action, it tests every aspect of graphics performance. **CS**